

SEMENCHENKO, V. K.

USSR/Chemistry - Physical chemistry

Card 1/2 Pub. 22 - 32/54

Authors : Semenchenko, V. K.; Kristan, E.; and Iveronova, V. I.

Title : Effect of admixtures on the surface tension and recrystallization of Sn

Periodical : Dok. AN SSSR 102/5, 973-975, Jun 11, 1955

Abstract : Experiments were conducted to determine the effect of admixtures (active & inactive) on the surface tension and recrystallization of Sn. It was found that surface active admixtures become adsorbed on the crystal facets filling in partially or completely their surface. In case of inactive admixtures the effect is negligible. A comparison of results shows that the admixture effect on surface tension, recrystallization, conversion and grain size is parallel in a majority of instances. The only exception was

Institution : The M. V. Lomonosov State University, Moscow

Presented by : Academician A. V. Shubnikov, January 26, 1955

Card 2/2 Pub. 22 - 32/54

Periodical : Dok. AN SSSR 102/5, 973-975, Jun 11, 1955

Abstract : found to be Te which reduces the surface tension, increases the re-crystallization point, reduced the grain size and aids conversion of Sn. Four USSR references (1932-1953). Table.

SEMEUCHENKO, V. K.

"Critical Phenomena and Dispersed State" (Kriticheskiye yavleniya i dispersnoye sostoyaniye) from the book Trudy of the Third All-Union Conference on Colloid Chemistry, pp. 250-257, Iz. AN SSSR, Moscow, 1956

(Report given at above Conference, Minsk, 21-4 Dec 53)

SEMENCHENKO, V.K.

Category : USSR/Atomic and Molecular Physics - Liquids

D-8

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6416

Author : Semenchenko, V.K.

Title : Fundamental Problems in Modern Theory of Solutions

Orig Pub : Zh. neorgan. khimii, 1956, 1, No 6, 1131-1149

Abstract : A survey paper delivered at the Third All-Union Conference on Physico-Chemical Analysis (June 1955). The paper consists of the following sections: Introduction, modern status of the problem of molecular forces, energy properties of molecules and structure of solutions, systems of reference in the thermodynamics of solutions, solutions of electrolytes, and critical phenomena in solutions. Bibliography, 39 titles.

Card : 1/1

SEMENCHENKO, V.K.

USSR/Thermodynamics - Thermochemistry. Equilibria.

B-8

Physical-Chemical Analysis. Phase Transitions.

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18428

Author : V.K. Semenchenko

Inst : ~~Institute of Organic and Inorganic Chemistry of Academy~~
of Sciences of USSR.

Title : Concerning Some Questions of Thermodynamics of Double
Mixtures.

Orig Pub : Izv. Sektora fiz.-khim. analiza IONK AN SSSR, 1956,
27, 30-35.

Abstract : Differential equations of equilibrium curves of a two-
phase binary system are analysed. These equations have
been derived by differentiating variables T , p , c , and
 c , of general equilibrium conditions $M'(T, p, c')$,
 $= M''(T, p, c'')$, $M_2'(T, p, c_2') = M_2''(T, p, c_2'')$, where
 c_j is the mol. fraction of the i component in the j
phase, by the variables T, p, c_1 and c_1'' . The final

Card 1/3

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SEMENCHENKO, V.K.

USSR / Electricity

17

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9625

Author : Semenchenko, V.K., Azimov, M.

Inst : Not given

Title : Phase Transitions of the Second Order and Critical Phenomena. VII. Dielectric Constant of a Nitro-Benzol-Hexane System in the Critical Region.

Orig Pub : Zh. fiz. khimii, 1956, 30, No 8, 1821-1829

Abstract : According to a theory of generalized critical values, the dielectric constant ϵ of binary liquid systems in the critical region passes through a maximum. In order to check this conclusion, an investigation was made of the dielectric constant of a system nitro-benzol-hexane, having an upper critical temperature T of the solution in the critical region. The determination of the dependence of ϵ on T was carried out using the beat method at a wavelength of 300 meters. T of

Card : 1/2

SEMINCHENKO, V. K.

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 Dielectric constants of binary liquid systems in the critical range. V. K. Semenchenko and M. Ashimov (M. V. Lomonosov State Univ., Moscow). *Zhur. Fiz. Khim.* 30, 2228-35 (1956); cf. *C.A.* 50, 8272a; 51, 7786h. — Theoretical conclusions of S. and A. regarding dielec. const. in the crit. range of binary systems were confirmed experimentally, by the heat method, for the PhNO₂-heptane and PhNO₂-octane systems. The max. is sharply defined at the crit. concn., and gradually decreases at increasing distance from the crit. concn. The max. dielec. const. of a system in the crit. concn. and temp. range changes with the concn. of the system in the same way as for the max. heat capacity of a system. The rise in the dielec. const. in the concn. and temp. interval closest to the crit. point, and of the sp. heat of such systems, indicates the existence of a crit. range of a finite extent with respect to concn. and temp. When the temp. of this max. is plotted, its concn. function curves are obtained similar to the soly. curves plotted from the disappearance of menisci. Results obtained from the dielec. const. detn. and the sp. heat measurements confirm the principal assumptions of generalized crit. phenomena. W. M. Sternberg.

PM KLS
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~~SEMENCHENKO, Vladimir Ksenofontovich; PUGACHEVICH, P.P.,redaktor;~~
NEGRIMOVSKAYA, R.A.,tekhnicheskiy redaktor

[Surface phenomena in metals and alloys] Poverkhnostnye iavleniia v
metallakh i splavakh. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry,
1957. 491 p. (MLRA 10:5)
(Surfaces (Technology))

SEMENCHENKO, VIK

✓ Buffer phenomena in surface tension for ternary systems.
V. B. Lazarev and V. K. Semenchuk. *Izv. Akad. Nauk S.S.R., Otdel. Khim. Nauk* 1957, 1957-3. 10th. Equations are derived for the surface tension, σ , isotherms for ternary systems. For a ternary system contg. a solvent, a surface-active, and an inactive component, the phenomenon of "quasi-buffering" occurs at some concn. interval. This is indicated by the fact that the curves that express the relation of σ to the concn. of the surface-active component intersect.

J. Rovtar Leach

SEMENCHENKO, V. K.

✓ 4637. PHASE TRANSITIONS AND CRITICAL PHENOMENA IN
ANISOTROPIC PHASES. V. K. Semchenko.
Kristallografiya, Vol. 2, No. 1, 145-52 (1957). In Russian.
A thermodynamical discussion, illustrated by consideration of
thermal expansion, heat capacity and light scattering of quartz on
raising the temperature through the point of α - β transition.
R. F. S. Harmon.

Moscow State U. in Lomonosov

SEMENCHENKO V.K.
LAZAREV, V.B.; SEMENCHENKO, V.K.

Buffering ability of the surface tension in ternary systems.
Izv. AN SSSR Otd. khim. nauk no.10:1252-1255 0 '57. (MIRA 11:3)

1. Institut obshchey i neorganicheskoy khimii im. N.S. Kurnakova
AN SSSR.

(Surface tension) (Systems (Chemistry))

SEMENTCHENKO, V. K.

✓ Mendeleev's periodic law and the modern development of
physics and chemistry. V. K. Sementchenko. Zhur. Fiz.
Khim. 31, 272-82 (1957). A review of the effects of the
periodic law of Mendeleev on the modern development of
the science (on occasion of the 50th anniversary of his
death). W. M. Stebbins.

SEMENCHENKO, Y.K.
SEMENCHENKO, Y.K.

Thermodynamics of magnetic substances and dielectrics. Zhur. fiz.
khim. 31 no.6:1420-1421 Je '57. (MIRA 10:12)

1. AN SSSR, Institut obshchey i neorganicheskoy khimii im. N.S.
Kurnakova.

(Thermodynamics) (Magnetic materials) (Dielectrics)

SEMENCHENKO, V. K.

"The Relationship Between The Properties Of The Liquid Phase And The Crystalline Aggregate Forming From It."

Hydrodynamics of Molten Metals (Gidrodinamika rasplavlennykh metalov; trudy pervogo soveshchaniia po teorii liteinykh protsessov. Moskva, Izd-vo Akad. nauk SSSR, 1958, 257 pp.

(Proceedings of the First Conference on the Theory of Casting Processes)

Moscow State University imeni "M. V. Lomonosov"

SEMENCHENKO, V. K.

76-1-18/32

AUTHORS: Semenchenko, V. K. , Yegupov, Ya. V.

TITLE: Second-Order Phase Transitions and Critical Phenomena (Fazovyye perekhody i kriticheskiye yavleniya)
VIII. The Specific Heat of Liquid Mixtures in the Critical Range of Separation (VIII. Teploymkost' zhidkikh smesey v kriticheskoy oblasti raslaivaniya)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1958, Vol. 32, Nr 1, pp. 121-130 (USSR)

ABSTRACT: Here, the temperature dependence of the specific heat of nitrobenzene-n-heptane- and nitrobenzene-n-octane systems in the critical range of separation was investigated. It is confirmed that the specific heat of binary liquid mixtures in the critical range of separation reaches a maximum on occasion of a variation of temperature. Therewith the conception of some researchers is disproved that a maximum of the specific heat is non-existing. It is shown that the maximum of the specific heat of a system given depends upon the concentration of the solution. The maximum of the specific heat is greatest in the solution with the critical concentrations. With increase and decrease of concentration of the solution, in comparison to the critical one, the value of the maximum of the specific heat decreases, and disappear entirely, at last. The

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75-1-18/32

Second-Order Phase Transitions and Critical Phenomena. VIII. The Specific Heat of Liquid Mixtures in the Critical Range of Separation

observations of a heat equilibrium during the measurement of the specific heat show that in the critical point the establishment of the heat equilibrium takes a particular long time. This fact points to a special state of the system in the critical point of separation. The experimental results obtained confirm the view of the one of the authors that the critical phenomena and the phase transitions of second order (if the increase of the specific heat near the critical point is the main characteristic of the generalized critical transition) are thermodynamically identical. Here, it was stated that the critical range of separation in binary liquid mixtures may reach some dozen of Mol %, according to the qualitative composition of the mixture of fractions. For this reason the maximum of the specific heat can not be determined by measurements of the specific heat in systems with a narrow critical range, if, on occasion of determining the critical concentration an error is present. Here, it was stated that the maximum of the specific heat of the liquid mixture can also develop in a narrow temperature interval. Thus, in the nitrobenzene-n-octane solution with critical concentration a temperature course of the specific heat with a maximum of 300 % was observed in the interval of 0,07°C. If, for that reason, the measurement of the specific heat takes place in the presence of relatively great temperature rises during a single calo-

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76-1-18/32

Second-Order Phase Transitions and Critical Phenomena. VIII. The Specific Heat of Liquid Mixtures in the Critical Range of Separation

rimetric experiment, the maxima of the specific heat are not found in this case. Here, it is experimentally shown that the specific heat in ternary liquid systems in the critical range of separation passes through a maximum, such as in the case of binary systems. Therefore it is concluded that the physical nature of separation is equal in binary and ternary systems. As a ternary system the n-propylalcohol - water - sodium nitrite system was investigated. There are 9 figures, 5 tables, and 19 references, 16 of which are Slavic.

ASSOCIATION: Moscow State University imeni M. V. Lomonosov
(Moskovskiy gosudarstvennyy universitet im. M. V. Lomomova)

SUBMITTED: October 17, 1956

AVAILABLE: Library of Congress

Card 3/3

SOV/62-59-2-37/40

5(2)

AUTHOR:

Semenchenko, V. K.

TITLE:

Two Limiting Cases of Thermodynamic Equilibrium (O dvukh predel'nykh sluchayakh termodinamicheskogo ravnovesiya)

PERIODICAL:

Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1959, Nr 2, p 368 (USSR)

ABSTRACT:

In the present letter to the editor the author writes: The thermodynamic equilibrium is stable if the second variation of the energy u is positive:

$$\delta^2 u = \sum_i \sum_j \frac{\partial^2 u}{\partial x_i \partial x_j} \delta x_i \delta x_j > 0; \quad (1)$$

$$x_i = T, p, E, H, \mu_k; \quad x = S, v, D, B, N_k. \quad (2)$$

(1) being the square form of the variation δx_i , it is positive if

$$\frac{\partial^2 u}{\partial x_i \partial x_j} = \alpha_{ij}; \quad D_n = \begin{vmatrix} \alpha_{11} & \alpha_{12} \dots \alpha_{1n} \\ \alpha_{21} & \alpha_{22} \dots \alpha_{2n} \\ \alpha_{n1} & \alpha_{n2} \dots \alpha_{nn} \end{vmatrix} \geq 0;$$

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Two Limiting Cases of Thermodynamic Equilibrium

SOV/62-59-2-37/40

$$D_{n-1} = \begin{vmatrix} \alpha_{11}, \alpha_{12} \dots \alpha_{1,n-1} \\ \alpha_{21}, \alpha_{22} \dots \alpha_{2,n-1} \\ \alpha_{n-1,1}, \alpha_{n-1,2} \dots \alpha_{n-1,n-1} \end{vmatrix} \geq 0 \dots \alpha_{11} \geq 0. \quad (3)$$

As a result, the system is stable at $0 \leq D \leq +\infty$. The case $D = 0$ was investigated, the case $D \rightarrow \infty$ not yet. It can be seen from the consideration of a simple system $x_i = T, p$; $x_i = S, v$ that the limiting states $\left(\frac{c_v}{T} \rightarrow 0; \kappa_s \rightarrow 0\right)$ exhibit the maximum stability from the thermodynamic point of view, which also explains their equilibrium properties: The independence of entropy of $\left(\frac{\partial S}{\partial p}\right)_T, \left(\frac{\partial S}{\partial H}\right)_T = 0$ and of the coordinates of T . The state $\left(\frac{\partial p}{\partial v}\right)_s \rightarrow \infty$ was not investigated since there are not yet any experimental data available.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii im. N. S. Kurnakova Akademii nauk SSSR (Institute of General and Inorganic Chemistry imeni N. S. Kurnakov of the Academy of Sciences, USSR)

SUBMITTED: October 31, 1958
Card 2/2

SEMENCHENKO, V.K.

Thermodynamics of high polymers and liquid crystals. Dokl.
AN BSSE 3 no.11:445-448 N '59. (MIRA 13:4)

1. Predstavleno akademikom AN BSSR B.V.Yerofeyevym.
(Polymers) (Liquid crystals)
(Thermodynamics)

SEMENCHENKO, V.K.; SHUKUROV, B.

Electric conductivity of solutions of electrolytes in $\text{CH}_3\text{CH} - \text{CH}_2\text{OH}$.
Uzb.khim.zhur. no.6:40-46 '59. (MIRA 13:4)

1. Moskovskiy gouniversitet im. M. V. Lomonosova i Institut khimii AN
UzSSR.

(Glycols) (Electrolytes--Conductivity)

SEMENCHENKO, V.K.; SHUKUROV, B.

Electric conductivity of solutions of CH_3COONa and $\text{CH}_3(\text{CH}_2)_{14}\text{COONa}$
in various solvents. Dokl. AN Uz. SSR no. 12:16-20 '59.

(MIRA 13:5)

1. Moskovskiy ordena Lenina gosudarstvennyy universitet imeni
M.V. Lomonosova i Institut khimii AN UzSSR. Predstavleno akad.
AN UzSSR S. Yu. Yunusovym.

(Sodium acetate--Electric properties)

(Palmitic acid--Electric properties)

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77092

SOV/62-59-12-36/43

AUTHORS: Semenchenko, V. K., Yashkichev, V. I.

TITLE: Brief Communications. Concerning the Evaluation of Generalized Moments by Quantum-Mechanical Methods

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 12, pp 2246-2248 (USSR)

ABSTRACT: The authors used the Schrödinger equation, which can be approximately solved by Hartree-Fock method [Ref. 12], for calculation of ionic potentials (for which the distance from the nucleus was equal to the corrected [Ref. 19] Goldschmidt ionic radii). These values, which were called quantum-mechanical generalized moments, are compared with the values of generalized moments calculated by application of Coulomb's Law.

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Brief Communications. Concerning the
Evaluation of Generalized Moments by
Quantum-Mechanical Methods

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SOV/62-59-12-36/43

The values of generalized moments, coulombic and quantum-
mechanical, arranged in decreasing order of the latter

Table 1

Ions	Be ⁺⁺	Mg ⁺⁺	Hg ⁺⁺	Ca ⁺⁺	Li ⁺	Cu ⁺	Al ⁺	K ⁺	Rb ⁺	Cs ⁺
Generalized quantum-mechanical moment in atomic units	3,150	1,471	1,078	1,064	0,789	0,709	0,434	0,432	0,358	0,370
Generalized coulombic moment in atomic units	3,106	1,427	0,943	1,015	0,777	0,540	0,388	0,397	0,355	0,320

The deviations of the values of generalized moments are relatively small for ions with inert-gas configurations (Li⁺, K⁺, Rb⁺, Cs⁺, Be⁺⁺, Mg⁺⁺, Ca⁺⁺), although the quantum-mechanical generalized moments are always larger than coulombic moments. The deviation is greater for ions with incomplete outer energy levels (Cu⁺, Al⁺, Hg⁺⁺). In solutions where

Card 2/3

5(4)

AUTHORS:

Semenchenko, V. K., Arkhangel'skiy, K. V. SOV/76-33-1-41/45

TITLE:

On the Dielectric Constant and the Dielectric Losses of Binary Liquid Systems in the Critical Region (O dielektricheskoy prornitsayemosti i dielektricheskikh poteryakh binarnykh zhidkikh sistem v kriticheskoy oblasti).

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 1, pp 230-232 (USSR)

ABSTRACT:

V. K. Semenchenko (Refs 1-4) had worked out the general theory of phase transitions of the second order and the critical phenomena in a previous paper as well as an equation (1) for determining the critical point (Ref 3). V. K. Semenchenko and M. Azimov (Ref 4) examined the dielectric constant of binary liquid systems in the critical region using the method of pulsations at a frequency of 1 megacycle. To check the results obtained in the case under discussion measurements were carried out of the dielectric constant ϵ and the value $\tan \delta$ (δ = angular difference up to 90° of the phase deviation angle between current and potential (Ref 5)) in the critical region of the system nitrobenzene-heptane with different concentrations and frequencies (Figs 1-4).

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On the Dielectric Constant and the Dielectric Losses of Binary Liquid Systems in the Critical Region

SOV/76-33-1-41/45

The measurements were taken on a special condenser; a thermostat TS-15 was used. The tests prove that ϵ and $\text{tg}\delta$ go through a maximum at the critical temperature. The value of ϵ and $\text{tg}\delta$ does not only depend on the concentration and temperature but also on the frequency. A frequency reduction causes a rise of the $\text{tg}\delta$ and ϵ values (Table). With a certain concentration and a given temperature the maxima of $\text{tg}\delta$ and ϵ coincide (in the critical region). There are 4 figures, 1 table, and 6 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova;
Voronezhskiy sel'skokhozyaystvennyy institut
(Moscow State University imeni M. V. Lomonosov: Voronezh
Agricultural Institute)

SUBMITTED: February 22, 1958

Card 2/2

SOV/76-33-3-3/41

5(4)

AUTHORS:

Zorina, Ye. L., Semenchko, V. K.

TITLE:

The Effect of Isoamyl Alcohol Upon Critical Phenomena in the System Triethylamine - Water (Vliyanie izoamilovogo spirta na kriticheskiye yavleniya v sisteme trietilamin - voda)

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 3, pp 523 - 533 (USSR)

ABSTRACT:

The unusual sensitivity of critical phenomena with respect to minimum admixtures has already several times been mentioned (Refs 4-8). The effect of minimum admixtures of isoamyl alcohol (I), sodium sulfate and nonyl alcohol upon critical phenomena was investigated; thus it was possible to determine the variation of the temperature function of viscosity in the system triethylamine - water. The additions were selected under consideration of the investigations of reference 9. In the present case the experimental results of the admixtures of (I) are given. Different amounts of (I) were stepwise added to the mixture to be investigated. The experimental results show (Table 1) that admixtures of (I) reduce the temperature of the maximum viscosity and vary the abnormal increase in

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The Effect of Isoamyl Alcohol Upon Critical Phenomena in the System Triethylamine - Water

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viscosity and the temperature ranges in which they proceed. The strongest effect of (I) was observed in mixtures being close to the critical concentrations (8.53 and 857% by mole of triethylamine). In the case of mixtures with a composition below the critical concentrations an effect of the admixtures of (I) was observed, contrary to that observed in connection with concentrations above the critical concentration. On the basis of a diagram (Fig 1) of the function $\lg \eta - 1/T$ the effect of the admixtures of (I) upon different sections of the curve is given (Figs 2-6, 8). There are 9 figures, 1 table, and 11 references, 8 of which are Soviet.

ASSOCIATION: Akademiya nauk SSSR, Institut neorganicheskoy khimii Moskva (Academy of Sciences, USSR, Institute of Inorganic Chemistry, Moscow)

SUBMITTED: July 16, 1956

Card 2/2

5 (4)

AUTHORS:

Zorina, Ye. L., Semenchko, V. K.

SOV/76-33-5-1/33

TITLE:

The Effect of Sodium Sulfate on the Critical Phenomena in the System Triethylamine - Water (Vliyaniye sul'fata natriya na kriticheskiye yavleniya v sisteme trietilamin - voda)

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 5, pp 961-969 (USSR)

ABSTRACT:

This work is the continuation of investigations of the effect of a third component on critical phenomena which can be determined by variations of the temperature dependence of viscosity. The methods of these investigations are described in references 1 and 2. The concentration of aqueous sodium sulfate solution (1.7 mol%) in the mixture of triethylamine - water varied between 0.007 mol% and 0.256 mol%. Triethylamine - water mixtures containing 7.36-9.33 mol% triethylamine were investigated. The results are summarized in a table. If Na_2SO_4 is added to mixtures the triethylamine content of which is below the critical one, the maxima of viscosity and the temperature interval of the abnormal viscosity increase are reduced; nonyl alcohol shows the same effect in

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contrast to isomyl alcohol. With triethyl amine concentrations above the critical value, Na_2SO_4 shows the opposite effect. The curve $\lg \eta(1/T)$ (η = viscosity in centipoise) given in figure 1 shows quantities marked with A, B, D, E, and G which quantitatively characterize the effect on the temperature dependence of viscosity and the effect of hysteresis; they are defined in reference 1. The variation of the values A and B depending on the concentration of sodium sulfate and triethylamine is shown in figures 2 and 3. Figure 4 shows the variation of hysteresis by Na_2SO_4 addition. Figures 5 and 6 indicate the same dependences for the values of D, E, and G. Figure 7 shows the variation of the solubility curve of triethylamine - water by sodium sulfate addition. Small Na_2SO_4 additions change the solubility curve by means of spirals, in contrast to isoamyl alcohol additions. Other authors gained similar experiences with mixtures of organic liquids with water if salt is added. Figures 8, 9, 10 show the values for A, B, E, and G with varying concentration of the

Card 2/3

The Effect of Sodium Sulfate on the Critical
Phenomena in the System Triethylamine - Water

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third component mentioned in order to compare the effect
of nonyl alcohol, isoamyl alcohol, and sodium sulfate.
There are 10 figures, 1 table, and 9 references, 6 of which
are Soviet and 1 Polish.

ASSOCIATION: Institut neorganicheskoy khimii Akademii nauk SSSR
(Institute of Inorganic Chemistry of the Academy of Sciences,
USSR)

SUBMITTED: July 16, 1957

Card 3/3

5 (4)

AUTHORS:

Semenchenko, V. K., Zorina, Ye. L.

SOV/76-33-6-2/44

TITLE:

The Effect of Nonyl Alcohol on the Critical Phenomena in the System Triethylamine - Water (Vliyaniye nonilovogo spirta na kriticheskiye yavleniya v sisteme trietilamin - voda)

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 6, pp 1176-1183 (USSR)

ABSTRACT:

Subsequently to a preceding paper (Ref 1) in which the influence of isoamylalcohol (I) on the temperature function of the viscosity of the system triethylamine - water (II) was tested, in the present case the influence of nonyl alcohol was investigated. It was worked according to the already described investigation method (Ref 1) whereby three different mixtures of (II) with different added amounts of (III) were used - one with an amount of triethylamine higher, one near at, and one lower than the critical concentration. The test results show that in contrast to (I) the abnormal rise of the viscosity of the mixtures is increased by the addition of (III) at concentrations of triethylamine over the critical concentration whilst it is decreased at concentrations of (T)

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Phenomena in the System Triethylamine - Water

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below the critical. The influence of (III) is most significant near the critical point. Both diagrams of the function of the values A, B, D, E and G (Ref 1) of the concentration of (III) in different (II) systems (Figs 1-7) and function diagrams of $\lg \eta$ of $1/T$ (Fig 8) are given. It was also discovered (as also in the system (Ref 1)), that the greatest alterations of the activation energy can be seen at mixtures with a concentration of (T) near the critical point. There are 10 figures, 1 table, and 3 Soviet references.

ASSOCIATION: Akademiya nauk SSSR, Institut obshchey i neorganicheskoy khimii, Moskva (Academy of Sciences of the USSR, Institute of General and Inorganic Chemistry, Moscow)

SUBMITTED: July 16, 1958

Card 2/2

24(8)

SCV/76-33-6-44/44

AUTHOR:

Semenchenko, V. K.

TITLE:

On the Thermodynamics of the Super States (K termodinamike sverkhsostoyaniy)

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 6,
pp 1440 - 1445 (USSR)

ABSTRACT:

According to the Nernst theorem, the reversibility represents a general property of the substances at the temperature of absolute zero and in the state of superconductivity and super flowability. Accordingly, these states - termed super states in the present case - are, in a certain respect, thermodynamically identical or similar. The present article deals with this problem, and refers to the following sections: Two limiting cases of thermodynamic stability. Determination of the expressions for the isodynamic coefficients of the stability for the system confirmed by thermodynamic and magnetic effects. Consideration of individual cases or limiting stability. Analysis of the results obtained. The following ascertainties were made: 1) The term of super states in which the system stops reacting to the effect of one of the thermodynamic forces X_i is introduced.

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On the Thermodynamics of the Super States

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2) It was shown that the super states - from a thermodynamic point of view - are states of maximum stability in which the determinant, which is composed of the second derivatives of the internal energy, tends to infinity in all thermodynamic coordinates $X_1 = S, V, D, H, \dots$. Starting from the assumption that only one of the adiabatic derivatives $(\partial X_i / \partial X_1)_{X_1} \rightarrow \infty$,

it was shown that the isodynamic derivatives of all generalized coordinates X_i towards X_1 , and the isodynamic derivatives of the coordinate X_1 conjugated with the given force towards other forces X_i , are equal to zero. The other derivatives remain finite.

4) The case $T \rightarrow 0$, $H \rightarrow H_c$, $p \rightarrow \infty$ was analyzed. In the first case, all results are obtained on the basis of the heat theorem, in the second case, the properties of the super dimagnets, and the third case corresponds to the hypothesis of Lewis-Polany on the analogy of the state of the substance at $T \rightarrow 0$ and $p \rightarrow \infty$. The results obtained show, however, that the properties of the substance at $T \rightarrow 0$ and $p \rightarrow \infty$ are different, which also results from the general formulation of the hypothesis by the

Card 2/3

On the Thermodynamics of the Super States

SOV/76-33-6-44/44

author of the present paper. There are 5 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: January 13, 1959

Card 3/3

SEMENCHENKO, Vladimir Ksenofontovich; TERLETSKIY, Ya.P., prof., metsenzent;
DROZHZHIN, Yu.N., red.; KOVALENKO, V.L., tekhn. red.

[Selected chapters of theoretical physics] Izbrannye glavy teoreticheskoi fiziki. Moskva, Gos uchebno-pedagog. izd-vo M-va prosv. RSFSR, 1960. 337 p. (MIRA 14:7)

(Physics)

SEMENCHENKO, V.K.; SHUKUROV, B.

Electric conductivity, solubility of electrolytes, and the
dielectric constant of the solvent. Uzb. khim. zhur. no.1:28-
37 '60. (MIRA 14:4.)

1. Moskovskiy gosuniversitet imeni M. V. Lomonosova i Institut
khimii AN UzSSR.

(Electrolytes—Conductivity)

SEMENCHENKO, V. K.

"Effect Of Surface-Active Admixtures On The Growth And Properties of Crystals."

report submitted for 4th Intl. Symposium on the Reactivity of Solids, Amsterdam, 30 May-4 June 1960.

68629

18.1260

S/126/60/009/02/017/033

E032/E31

AUTHORS: Semenchenko, V.K. and Dogadkina, N.P.

TITLE: The Properties of Ternary Metallic Systems I. Micro-hardness of the Ternary Alloys Sn-Na-Al

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 2, pp 265 - 269 (USSR)

ABSTRACT: The instrument used to prepare Sn-Na alloys is shown in Figure 1. In this figure 1 is the furnace, 2 is a suspended piece of filtered tin and 3 is an ampoule containing sodium. The whole apparatus was attached to a vacuum system and after a four-hour baking at 100 to 150 °C, the sodium-containing ampoule was drawn upwards with the aid of the magnet 4 and then released so that it fell down onto the piece of tin and the glass was broken. The tin was then melted down and the remains of the ampoule served as a stirrer. The combination was heated up to 450-550 °C and the system was sealed off from the vacuum chamber. The alloy was then stirred several times and transferred into the ampoule 5. In this way, Sn-Na alloys with 1.0 and 1.39% Na were prepared.

Card1/4

68629

S/126/60/009/02/017/053

E032/E314

The Properties of Ternary Metallic Systems 1. Microhardness of the Ternary Alloys Sn-Na-Al

Sn-Al alloys were prepared by simple melting in the required proportions. Figure 2 shows the system used to obtain Sn-Na-Al alloys. The apparatus consisted of a thermostat partly filled with sand and containing two identical ampoules consisting of two parts separated by the capillary a. The ampoules were connected to a vacuum chamber and were baked for about 4 hours at a pressure of 5×10^{-5} mm Hg. The substances making up the final alloy were at b (Figure 2). The ampoules were then sealed off from the vacuum system and the thermostat was filled up with hot sand (200 to 300 °C) and covered with a lid which carried a heater. The temperature was raised to 400 °C and the alloy was agitated. The thermostat was then turned upside down and the alloy was filtered into the second part of the ampoule through the capillary. The thermostat was cooled in the latter position over 9 to 10 hours. In this way alloys of various composition were prepared. ✓

Card2/4

68629

S/126/60/009/02/017/033

EO32/E314

The Properties of Ternary Metallic Systems 1. Microhardness of the Ternary Alloys Sn-Na-Al

The microhardness was measured with the PMT-3 microhardness tester. The results obtained are summarised in Table 2 and Figures 3 to 5. Figure 3 shows the dependence of the microhardness of Sn-Na-Al on the concentration of Na for various concentrations of Al as indicated. Figure 4 shows the dependence of the microhardness of Sn-Na-Al on the concentration of aluminium for various concentrations of Na as indicated. Figure 5 shows the microhardness of Sn-Na-Al as a function of the concentration of aluminium for different concentrations of Na, the numeration of the curves being the same as in Figure 4. It is found that it is possible to prepare an alloy with a given concentration of the inactive component (Al) whose microhardness should remain constant when the concentration of the surface-active component (Na) is altered. The addition of Na and Al to Sn-Na and Sn-Al alloys, respectively, tends to increase the microhardness as indicated in the above figures. ✓

Card3/4

S/126/60/009/02/018/033
E032/E314

AUTHORS: Semenchenko, V.K. and Saidov, M.

TITLE: The Properties of Ternary Metallic Systems II. On the Simultaneous Effect of Surface-active and Inactive Components on the Microhardness of Tin 17

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 2, pp 270 - 273 (USSR)

ABSTRACT: Measurements are reported of the microhardness of Sn-Te-Zn and Sn-Te-Al alloys as a function of the concentration of Zn and Te, and Al and Te, respectively. The tin employed had the following composition (spectral analysis): 0.01% Sb, 0.0084% Cu, 0.0005% Pb, 0.0009% Bi, 0.00025% Ag, 0.0197% Fe and 0.0018% Ni. The purity of the aluminium was 99.99% and that of Zn 99.9%. The Te was purified by double distillation. The alloys were prepared in a vacuum of 10^{-5} mm Hg and the microhardness was measured with the aid of the PMT-3 microhardness tester. The results obtained are summarised in Tables 1 and 2. Taken separately, Te, Zn and Al increase the microhardness of tin. However, when they act together

Card1/3

S/126/60/009/02/018/033

E032/E314

The Properties of Ternary Metallic Systems^{II}. On the Simultaneous Effect of Surface-active and Inactive Components on the Microhardness of Tin

the situation is quite different; in fact, Figures 1 and 2 show that for low concentrations of Al and Zn, Te increases the microhardness but as the concentration of the inactive components is increased further the microhardness remains practically constant. The figure captions are as follows: Figure 1 - dependence of the microhardness of tin and tin-aluminium alloys on the concentration of Te; Figure 2 - the dependence of the microhardness of tin and tin-zinc alloys on the concentration of Te; Figure 3 - dependence of the microhardness of tin and tin-tellurium alloys on the concentration of aluminium; Figure 4 - dependence of the microhardness of tin-tellurium alloys on the concentration of zinc; Figure 5 - dependence of the solubility of aluminium, zinc, cadmium, bismuth, sodium and tellurium in tin on the difference between the generalised moments (generalised moment is defined as the ratio of the ionic

Card 2/3

81580

S/076/60/034/06/40/040
B015/B061

5.4220

AUTHOR:

Semenchenko, V. K.

TITLE:

The Connection Between the Thermodynamic Stability of a System and the Kinetics of the Processes Taking Place Within It

PERIODICAL:

Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 6,
pp. 1384-1385

TEXT: With the aid of Fourier equations for heat conductivity, the kinetics of a process is described with consideration of the fluctuation, since this is inversely proportional to the coefficients of thermodynamic stability. It is shown that the value of the kinetic coefficients always sinks with rising fluctuation. At the lower limit of stability, the adiabatic kinetic coefficients pass through a certain minimum, and the isodynamic kinetic coefficients a zero value, which confirms the assumption that a maximum retardation of all processes occurs in the critical range, as is shown by the explanations given on the fluctuation in this range. This assumption is experimentally confirmed. There are 4 references: 3 Soviet and 1 American.

Card 1/2

SEMENCHENKO, V.K.

Physical nature of phase transitions of the second order.

Zhur.fiz.khim. 34 no.7:1649-1650 J1 '60.
(MIRA 13:7)

1. Moskovskiy gosudarstvennyy universitet im. M.V.
Lomonosova.

(Thermodynamics) (Phase rule and equilibrium)

S/076/60/034/007/039/042/XX
B004/B068

AUTHOR: Semenchenko, V. K.

TITLE: Physical Character of Phase Transitions of Type II

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. ",
pp. 1649 - 1650

TEXT: In Ref.1, the author formulated a theorem of stable limiting states which permits a better defined interpretation of the character of second-type phase transitions. According to Gibbs, the author proceeds from the fact that the equilibrium stability is determined by the determinant D. D is written for a system, the state of which is characterized by the coordinates x_i . It is proved that the second derivatives of the thermodynamic potential Z are equal to the reciprocal values of the derivatives $(\partial X_i / \partial x_i)_{X_j}$. The condition

$\Delta(x_i/x_i)_{X_j} = \Delta(1/D) \partial(X_1 \dots X_{i-1}) / \partial(x_1 \dots x_{i-1})$ (7) is written.

Card 1/3.

Physical Character of Phase Transitions of Type II

S/076/60/034/007/039/042/XX
B004/B068

Equation (7) is a sufficient condition for the inequality

$$(\partial^2 Z' / \partial X_i^2)_{X_j} = (\partial x_i' / \partial X_i)_{X_j} \neq (\partial^2 Z'' / \partial X_i^2)_{X_j} = (\partial x_i'' / \partial X_i)_{X_j} \quad (3) \text{ established}$$

by P. Ehrenfest (Ref.2). It was stated in Ref.1 that, in addition to the lower limit of the stability determinant D, there must be an upper limit: $0 \leq D \leq +\infty$ (8). The investigation described in Ref.1 leads to the conclusion that there are stable limiting states in which at least one adiabatic stability coefficient approaches infinity and, therefore, also $D \rightarrow \infty$. It is concluded that the second-type phase transitions are a special case of critical transitions which are valid only for equilibria between superphases and ordinary phases. The interpretation of many cases of equilibrium in alloys, polymers, and solutions as second-type phase transitions is unfounded since the second derivatives $(\partial X_i / \partial x_i)_{X_j}$ are always equal when the limit is exceeded. It is assumed that transcritical transitions are involved here, with the second derivatives of the Z potential passing through finite extreme values. There are 5 references: 4 Soviet and 1 Dutch.

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Physical Character of Phase Transitions S/076/60/034/007/039/042/XX
of Type II B004/B068

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova
(Moscow State University imeni M.V. Lomonosov)

SUBMITTED: November 4, 1959

Card 3/3

SEMENCHENKO, V.K. (Moscow)

Thermodynamics of critical and trans-critical phenomena in
solutions. Zhur.fiz.khim. 35 no.11:2448-2457 N '61.
(MIRA 14:12)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
(Solution (Chemistry))
(Phase rule and equilibrium)

BOGUSLAVSKIY, Sergey Anatol'yevich [deceased]; SEMENCHENKO, V.K., prof.,
red.; CHERNYAK, L.Ye., red.; BRUDNO, K.F., tekhn.red.

[Selected works on physics] Izbrannyye trudy po fizike. Pod red.
i s primechaniami V.K.Semenchenko. Moskva, Gos.izd-vo fiziko-
matem.lit-ry, 1961. 436 p. (MIRA 14:6)
(Physics)

SEMENCHENKO, V.K.; ARKHANGEL'SKIY, K.V. (Moskva)

Dielectric constant and losses in the critical region of the layer separation of binary liquid systems. Zhur. fiz. khim. 35 no. 4:927-931 Ap '61. (MIRA 14:5)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova i Voronezhskiy sel'skokhozyaystvennyy institut.
(Systems (Chemistry))

SEMENCHENKO, V.K.

Pretransitional phenomena during phase transitions. Zhur.fiz.khim.
35 no.10:2398-2399 0 '61. (MIRA 14:11)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.
(Melting pc'nts) (Phase rule and equilibrium)

SEMENCHENKO, V.K.

Thermodynamics of mesophases and the properties of polymers and
liquid crystals. Prim.ul'traakust.k issl.veshch. no.16:101-116
'62. (MIRA 16:4)
(Phase rule and equilibrium) (Polymers) (Liquid crystals)

SEMENCHENKO, V.K.

STRUCTURE AND PHYSICAL PROPERTIES OF MATTER IN A LIQUID STATE
reports read at the 4th Conference convened in KIEV from 1 to 5 June
1959, published by the publisher House of KIEV University, KIEV,
USSR, 1962

A.Z. GOLIK and I.P. KLASSEN, Connection Between Viscosity and Electrical Conductivity and the Structure of Zinc and Cadmium Amalgams	96
A.S. LASHKO, Roentgenographic Investigation of the Liquid Au-Sn Alloy	101
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YA.I. GERASIMOV, A.V. NIKOL'SKAYA and A.M. YEVSEYEV, Thermodynamic Properties of Liquid Metallic Alloys	115
N.L. POKROVSKIY and D.S. TISSEN, Investigation into Adsorption Layers on a Liquid Metallic Surface	119
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27.1200

32635
S/076/62/036/001/002/017
B101/B102

AUTHOR: Semenchenko, V. K.

TITLE: Thermodynamics of protoplasm

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 1, 1962, 15-20

TEXT: The applicability of the thermodynamics of mesophases to the properties of protoplasm is discussed. As mesophase, the state is defined, the processes of which take place near equilibrium and are characterized by stability coefficients (SC). The SC are derivatives of the thermodynamic quantities $X = T, p, \mu, \vec{E}, \vec{H}$ with respect to the coordinates $x_i = S, V, c_j, \vec{D}, \vec{B}, (\partial x_i / \partial x_j)$ conjugated with them. At $x_i = \text{const}$, the SC are adiabatic, and at $X_i = \text{const}$ they are isodynamic. $T/C_p; (\partial p / \partial V); 1/\epsilon$ (ϵ = dielectric constant); $1/\mu$ (μ = magnetic susceptibility) are given as examples of SC, and the region within the curve $(\partial^2 p / \partial V^2)_T = 0$ is given as an example of a mesophase. Mesophases are characteristic of high-molecular compounds which neither crystallize completely nor are completely

Card 1/2

Thermodynamics of protoplasm

32635
S/076/62/036/001/002/017
B101/B102

fluidized: conversion of high polymers through transcritical transitions. The mesophase is characterized by low thermodynamic stability, low optical and mechanical anisotropy, increased specific heat, compressibility, and viscosity, and largely reduced thermal conductivity. Accordingly, protoplasm can be regarded as a multicomponent mesophase which is probably ferroelectric, i.e., ϵ and $\tan\delta$ probably have maximum values within a certain temperature range. The removal of the mesophase from protoplasm entails pathological states. The slow and weak reaction to external effects owing to low values of kinetic coefficients and SC makes adaptation and survival of organisms possible. Since mesophases can exist in various temperature ranges, the existence of protoplasm on the basis of glass on other celestial bodies cannot be ruled out. M. M. Martenyuk is mentioned. There are 4 figures and 12 references: 8 Soviet and 4 non-Soviet. The reference to the English-language publication reads as follows: J. D. Hoffman, J. Amer. Chem. Soc., 5, 1697, 1952. X

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: October 7, 1961

Card 2/2

S/076/62/036/011/013/021
B101/B180

AUTHORS: Arkhangel'skiy, K. V., and Semenchenko, V. K.

TITLE: Dielectric method of studying the thermodynamic stability of liquid binary systems

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 11, 1962, 2501-2506

TEXT: The dielectric constants of binary mixtures with critical ranges, such as nitro-benzene + octane (52.65 mole% of nitro-benzene), and nitro-benzene + heptane (45-50 mole% of nitro-benzene) were measured as dependent on composition, temperature, frequency, and the presence of impurities. A capacitor with 1.2 mm electrode spacing was used, to reduce the effect of changes in density occurring near the critical temperature. It was found that the curves $1/\epsilon'$ or $1/\epsilon''$ versus temperature can be used to follow phase transitions accurately in any system, as $1/\epsilon'$ and $1/\epsilon''$ are stability coefficients in the sense of the thermodynamic theory of phase transitions. There are 10 figures and 1 table. ✓

Card 1/2

ARKHANGEL'SKIY, K.V.; SEMENCHENKO, V.K.

Concerning the determination of the critical region and
critical temperature. Zhur. fiz. khim. 36 no.11:2564-
2566 N'62. (MIRA 17:5)

1. Moskovskiy gosudarstvennyy universitet i Voronezhskiy
sel'skokhozyaystvennyy institut.

S/058/63/000/002/037/070
A062/A101

AUTHORS: Semenchenko, V. K., Akhrarov, S.

TITLE: Investigation on the dielectric permittivity of double liquid systems in the critical region

PERIODICAL: Referativnyy zhurnal, Fizika, no. 2, 1963, 11 - 12, abstract 2E65
(In collection: "Vopr. sovrem. fiz. i matem.", Tashkent, AN UzSSR, 1962, 9 - 14)

TEXT: The dielectric permittivity (ϵ) was investigated near the critical lamination points of liquid systems of nitrobenzol-cyclohexane and nitrobenzol-nonane. The measurements were carried out by the beat method on the frequency 1 Mc/s with an accuracy 0.5% and thermostating to 0.01°C. It is established that at critical temperatures and concentrations the values of ϵ pass through a sharply pronounced maximum. The magnitude and the sharpness of the maximum decrease as the concentration deviates from the critical value; also the temperature corresponding to the maximum is displaced. The results obtained confirm the view point of V. K. Semenchenko about the equivalency of the second-kind transitions and the

Card 1/2

SEMENCHENKO, V.K.; LAZAREV, V.B.

Dependence of the surface tension of ternary solutions on component concentration and temperature. Izv. AN SSSR. Otd.khim.nauk no.11: 2089-2091 N '62. (MIRA 15:12)

1. Institut obshchey i neorganicheskoy khimii im. N.S. Kurnakova
AN SSSR.

(Systems (Chemistry)) (Surface tension)

S/250/63/007/003/006/006
A059/A126

AUTHORS: Martynyuk, M.M., Machionis, Z.A., Yerofeyev, B.V., Semenchenko, V.K.

TITLE: Compressibility of polystyrene and poly- α -methylstyrene and its dependence on the molecular weight

PERIODICAL: Doklady Akademii nauk BSSR, v. 7, no. 3, 1963, 170 - 173

TEXT: The temperature dependence of the compressibilities of polystyrenes of the molecular weights of 1,000, 4,100, 7,300, 23,900, 37,500, 141,000, and 613,900, and of the poly- α -methyl styrenes of the molecular weights of 606,800 and 54,800 was measured by way of reducing the pressure in the range from 400 to 200 kg/cm², as described by M.M. Martynyuk and V.K. Semenchenko (Kolloidnyy zhurnal, v. 25, no. 2, 1963). The monomers were subjected to anionic polymerization according to Schwarz, and their molecular weights measured in toluene with an Ubbelohde-type viscometer described by S.R. Rafikov (Vysokomolekulyarnyye soyedineniya, v. 1, 1,558, 1959), while those of the polymers up to 7,300 were determined cryoscopically in benzene. The polystyrene samples were pressed and slowly cooled at 400 kg/cm² and 180 to 220°C in dependence on the molecular

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8/250/63/007/003/006/006
A059/A126

Compressibility of polystyrene and

weight, and at 260°C for poly- α -methyl polystyrene. Thermal destruction of the polymers was 18% on the average, the structures being completely amorphous according to x-ray data. The three highest-molecular polystyrenes and the poly- α -methyl styrenes showed practically uniform compressibilities. Three temperature regions were established on the compressibility curves, namely a) that of low compressibility independent of temperature; b) the intermediate one with a fast increase of compressibility with temperature; and c) that of high compressibility showing a linear increase with temperature. The compressibilities of polystyrenes with molecular weights in excess of 30,000 can be given for temperatures above 110°C by the equation:

$$- 10^6 \left(\frac{\partial v}{\partial p} \right)_T = (t - 110) 0.233 + 49,$$

where t is given in °C, and

$$- \left(\frac{\partial v}{\partial p} \right)_T = \frac{1}{M} \left(\frac{\partial V}{\partial p} \right)_T \text{ cm}^3/\text{g-atm},$$

with v being the specific volume and V the volume. = corresponding equation for poly- α -methyl styrene with M in excess of 55,000 and temperatures above:

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Compressibility of polystyrene and

S/250/63/007/003/006/106
A059/A126

180°C is

$$- 10^6 \left(\frac{\partial v}{\partial p} \right)_T = (t - 180) 0.2 + 52.$$

Three characteristic points are found on the compressibility curve of the amorphous polymers, i.e., a) the end point t_1 of the first region after which the compressibility increases; b) the initial point t_2 of the third region after which a linear dependence of the compressibility is established; and c) the inflexion point t_i , where the compressibility is half the sum of the compressibilities at the points t_1 and t_2 . t_1 for polystyrenes of molecular weights in excess of 35,000 is practically independent at about 101°C, while, for lower-molecular polymers, the equation $t_i = 6.6 \ln M + 32$ holds. The polydispersity of the sample was experimentally shown to have no marked effect on the compressibility curve of high-molecular polymers. L.M. Kantorovich and M. Rapoport are mentioned. There are 2 figures and 1 table.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet im. V.I. Lenina (Belorussian State University im. V.I. Lenin); Moskovskiy pedagogicheskiy institut im. N.K. Krupskoy (Moscow Pedagogic Institute im. N.K. Krupskaya)

SUBMITTED: December 25, 1962
Card 3/3

S/069/63/025/002/001/010
A057/A126

AUTHORS: Martynyuk, M.M., Semenchenko, V.K.

TITLE: Thermodynamics of polymers. 3. Thermodynamic stability of crystalline polymers

PERIODICAL: Kolloidnyy zhurnal, v. 25, no. 2, 1963, 190 - 196

TEXT: The temperature dependence of the isothermal compressibility and the coefficient of thermal expansion of low and high pressure polyethylene, isotactic polypropylene, and polytrifluorochloroethylene has been determined in continuation of earlier investigations (Koll. zh., v. 24, 1962, 328 and 611). For high-pressure polyethylene the temperature dependencies of

$$\left(\frac{\partial v}{\partial p}\right)_S, \left(\frac{\partial S}{\partial T}\right)_V, \left(\frac{\partial p}{\partial T}\right)_V, \frac{C_p}{C_v},$$

as well as of the sound velocity and the stability determinant have been calculated. The investigations have confirmed the existence of a mesophase state of the crystalline polymers in the region of their melting temperature. It has been

Card 1/2

Thermodynamics of polymers. 3. Thermodynamic

3/069/63/025/002/1106/010
A057/A126

shown that phase transitions of these substances are mesophase transitions. Measurements were done on a special device. The essential features of it are a lever system, which effects the pressure load by means of weights, a micro-indicator for the change of the volume of the sample, and the device for temperature regulation (20 - 300°C). There are 10 figures and 1 table.

ASSOCIATION: Moskovskiy oblastnoy pedagogicheskiy institut (Moscow Regional Pedagogic Institute); Moskovskiy universitet im. M.V. Lomonosova, Fizicheskiy fakul'tet (Moscow University imeni M.V. Lomonosov, Physical Department)

SUBMITTED: May 29, 1962

Card 2/2

MARTYNYUK, M.M.; SEMENCHENKO, V.K.

Thermodynamics of polymers. Part 4: Compressibility of amorphous
polymers. Koll.zhur. 26 no.1:83-89 Jan '64. (MIRA 17:4)

1. Moskovskiy oblastnoy pedagogicheskoy institut i Moskovskiy
universitet, fizicheskoy fakul'tet.

SEMENOV, V.K.

Statistical theory of dipole-dipole interactions. *Dokl. Akad. Nauk SSSR* 1981, 261, 1018-1021. (MIRA 18 1.)

... M. S. Gorbunov, M. V. Lomonosov.

SEMENCHENKO, V.K.

Certain problems involved in the theory of thermodynamic stability.
Zhur. fiz. khim. 38 no.9:2311-2316 9 '64. (MIRA 17:12)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

BASKAKOVA, V.B.; GOLOVIN, A.V.; MARTYNYUK, M.M.; SEMENCHENKO, V.K.

Calculation of the speed of sound from the isodynamic coefficients
and the determinant of the stability of a substance. Akust. zhur.
11 no.1:30-34 '65. (MIRA 18:4)

1. Moskovskiy gosudarstvennyy universitet.

SEMENCHENKO, V.R.; BASKAKOVA, V.B.

Geometric meaning of the stability determinant. Zhur. fiz. khim. 39
no.3:729-735 Mr '65. (MIRA 13:7)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

SEMENCHENKO, V.K.

Thermodynamics of low temperatures. Zhur. fiz. khim. 38 no.7:1871-1873
Jl '64. (MIRA '18:3)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

L 31512-66 EWI(m)/ENP(t)/ETI IJP(c) JD/JW

ACC NR: AP6008095

SOURCE CODE: UR/0076/66/040/002/0458/0460

AUTHOR: Semenchenko, V. K.; Soldatova, Ye. D.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: Thermodynamic stability of germanium and silicon near absolute zero

SOURCE: Zhurnal fizicheskoy khimii, v. 40, no. 2, 1966, 458-460

TOPIC TAGS: germanium single crystal, silicon single crystal, thermodynamic calculation, thermal expansion

ABSTRACT: The determinant of thermodynamic stability D^{-1} per unit volume,

$$D^{-1} = \begin{vmatrix} s_{ij} & T\alpha_i & T \\ \alpha_i & T & \frac{pc_p}{T} \end{vmatrix} = \begin{vmatrix} s_{11} & s_{12} & s_{13} & 0 & 0 & 0 & \alpha \\ s_{12} & s_{11} & s_{12} & 0 & 0 & 0 & \alpha \\ s_{13} & s_{12} & s_{11} & 0 & 0 & 0 & \alpha \\ 0 & 0 & 0 & s_{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & s_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & s_{44} & 0 \\ \alpha & \alpha & \alpha & 0 & 0 & 0 & \frac{pc_p}{T} \end{vmatrix}$$

UDC: 541.11

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L 01817-67 EWT(1) JW

ACC NR, AP6035639

SOURCE CODE: UR/0076/66/040/005/1082/1085

SEMENCHENKO, V. K., and SOLDATOVA, Ye. D., Moscow State University
 imeni M. V. Lomonosov

38
B

"Thermodynamics of Transcritical Phenomena in Condensed Systems"

Moscow, Zhurnal Fizicheskoy Khimii, Vol XL, No 5, May 1966,
 pp 1082-1085

Abstract: A new type of phase transition was investigated -- mesophasal or transcritical transitions. They occur within a specific interval of thermodynamic forces, are fluctuating, and consist of the passing through the region of reduced stability, exhibiting properties of two quasiphases (mesophase). The term quasiphase was introduced because in the region of transition in question, the system remains monophasal. Mathematically, the transition is expressed in the passage of adiabatic and isodynamic coefficients of stability and D in the region of the transition through finite minima ($D \neq 0$, $dD = 0$). Comparison of the behavior of the determinant of the stability of liquid - vapor systems in transcritical transitions (water) and the system ferromagnetic - paramagnetic in the region of the Curie temperature (nickel), and also the effect of thermodynamic forces on their stability in the transcritical region makes it possible to conclude that these transitions are identical from the thermodynamic point of view.

UDC: 541.11

0922 0041

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ACC NR: AR6035099

SOURCE CODE: UR/0137/66/000/008/A005/A005

AUTHOR: Ibragimov, Kh. I.; Pokrovskiy, N. L.; Pugachevich, P. P.;
Semenchenko, V. K.

TITLE: Investigation of the surface tension of the tin-bismuth and tin-lead
systems

SOURCE: Ref. zh. Metallurgiya, Abs. 8A39

REF SOURCE: Sb. Poverkhnostn. yavleniya v rasplavakh i voznikayushchikh iz
nikh tverd. fazakh. Nal'chik, 1985, 169-276

TOPIC TAGS: tin, bismuth system, tin lead system, surface tension, temperature
coefficient, gravitation method

ABSTRACT: The surface tension σ of the Sn—Bi (14 alloys) and Sn—Pb
(13 alloys) systems has been investigated by the gravitational method. The
isotherms and polytherms obtained did not show extreme or bend points. The
eutectic fields of both systems were carefully analyzed. The study of the relation
 $\sigma=f(t)$ revealed a number of new phenomena. With increased concentration of
one of the components, a regular decrease of the temperature coefficient of the

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UDC: 669.6'4-154:532.61

ACC NR: AR6035099

surface tension $d\sigma/dt = K$ is observed. For the Sn—Bi system, K passes through zero twice, while for the Sn—Pb system, the values $K < 0$. Orig. art. has: 5 figures. Bibliography of 7 titles. G. Fents. [Translation of abstract]
[NT]

SUB CODE: 11/

SEMENCHENKO, Z. P.

USSR/Medicine - Sheep
Medicine - Vitamin A

Jan 1948 /

"The Significance of Vitamin A and Vitamin Therapy in Sheep Breeding," Prof T. V. Gorb, Dr of Agr Sci; Z. P. Semenchenko, Aspirant, All-Union Inst Animal Husbandry, 5 pp

"Veter" No 1

Tests to establish effect of vitamins on sheep obtained following results: lack of vitamin A in feed will lower productivity of sheep; lack of this vitamin has adverse effects on organic function of sheep; lambs, observed to have become sick as a result of eating feed off ground, were cured by addition of vitamin A to this feed.

CamCo

SEMENCHENKO, Z. P.

Dairy Cattle

"Increasing cows' productivity." Kolkh. proizvod. 12 no.7, 1952.

Monthly List of Russian Accessions, Library of Congress, October, 1952. UNCLASSIFIED.

SEMENCHENKO, Z.P.

[Two-cycle system of work on farms] Dvopromizhnyi rozporiadok
dnia na fermi. [Kharkiv] Kharkivs'ke obl. vyd-vo, 1955. 59 p.
(Farm management) (MLA 10:6)

SEMENCHENKO, Zakhar Prokof'yevich; PARKHOMENKO, O.I., red.; LIMANOVA,
M.I. [Lymanova, M.I.], tekhn.red.

[Possibilities for protein feeding] Rezerv bilkovykh kormiv.
Kharkiv, Kharkivs'ke knyzhkovye vyd-vo, 1960.

(MIRA 14:12)

1. Khar'kovskiy sel'skokhozyaystvennyy institut imeni V.V.
Dokuchayeva (for Semenchenko).
(Feeding and feeds) (Proteins)

SEMENCHENKOV, A.T.

137-58-4-8439

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 303 (USSR)

AUTHORS: Kontorovich, I. Ye., Semenchikov, A. T.

TITLE: The Structure of Alloys of the Titanium-aluminum System
(Stroyeniye splavov sistemy titan-alyuminiy)

PERIODICAL: Sb. tr. Mosk. vech. metallurg. in-t, 1957, Nr 2, pp 176-186

ABSTRACT: The structure and certain properties of Ti-Al alloys of up to 67 atomic % of Al were studied. The alloys were made of sponge Ti 99.80% pure and sheet Al 99.99% pure, the residue being 0.0035% Fe, 0.0025% Si and 0.0050% Cu. Smelting was in an arc furnace with water-cooled Cu bottom plate and a W electrode at 250-300 mm Hg Ar atmosphere. During smelting the alloys were shielded from saturation by gases (O₂ and N₂) having a powerful effect upon their properties. Ti alloys with 8, 15, 30, 44, 57, and 67 atomic % Al were made. The specimens were annealed in quartz ampoules exhausted at 1300°C for 1 hour, at 960° for 50 hours, and at 850° for 200 hours with subsequent quenching in water. Microscopic analysis was employed; hardness and microhardness were also studied. The work confirmed the existence of phase regions in the Ti-Al diagram and revealed

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137-58-4-8439

The Structure of Alloys of the Titanium-aluminum System

the structure of the alloys with up to 67 atomic % Al. It was shown that specimens hardened from the β region undergo diffusionless transformation of the β phase into spicular α' phase by a $\beta \rightarrow \alpha'$ reaction. When alloys containing >15 atomic % Al are quenched, a solid α solution is found in the $\alpha + \beta$ region. Al very effectively increases the hardness of Ti, which rises from 200 units for pure Ti to 507 for an alloy containing 44 atomic % Al ($\alpha + \beta$). When the Al contents are still higher (up to 67 atomic %), hardness drops to 415. Alloys containing high amounts of Al (57 and 67 atomic %) (β and $\beta + \text{TiAl}_3$ regions) are excessively brittle.

E. K.

1. Aluminum-titanium alloys--Microstructure
2. Aluminum-titanium alloys--Properties

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The Zirconium Angle of the Phase Diagram of the System SOV/78-4-6-34/44
Zr-Sn-Mo

solid α - and β -solutions and intermetallic phases $ZrMo_2$ and Zr_4Sn exist in dependence on temperature. The change of the parameter of the α - and β -phase in the alloys with 10 gram - atomic percentage Sn+Mo which were hardened at 900° is given in figure 3. The microstructure- and X-ray analyses of the alloys with 10 gram - atomic percentage Sn+Mo show an increase of the $ZrMo_2$ formation. The radiographs of the alloys which were hardened at 700° are given in figure 6. The radiograph of the alloy of zirconium with 3 gram - atomic percentage Mo, hardened at 675° , 685° , and 700° is given in figure 8. The microstructure of these alloys is given in figure 7 (a - v). The eutectoid horizontal line which corresponds to the transformation $\beta \rightleftharpoons \alpha + ZrMo_2$ lies in the system zirconium-molybdenum at 680° and is therefore by 100° lower than that given in publications (Ref 7). In all investigated alloys with 4 gram - atomic percentage Sn+Mo only the α -phase is formed at 525° . The projection on the concentration surface of the polythermal diagram

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The Zirconium Angle of the Phase Diagram of the System Zr-Sn-Mo SOV/78-4-6-34/44

is given in figure 9. The scheme of the nonvariant and monovariant reactions in the zirconium angle of the system zirconium-lead-molybdenum is given in figure 10. There are 10 figures and 7 references, 2 of which are Soviet.

SUBMITTED: March 1, 1958

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SOV/78-4-7-27/44

5(2), 18(6), 18(7)

AUTHORS: Ivanov, O. S., Semenchikov, A. T.

TITLE: The Conversion of the Ternary Alloys of the Zirconium-corner of the System Zr - Sn - Mo in Hardening and Tempering (Prevrashcheniye troynykh splavov tsirkoniyevoogo ugla sistemy Zr - Sn - Mo pri zakalke i otpuske)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 7, pp 1625-1629 (USSR)

ABSTRACT: In an earlier paper (Ref 1) the zirconium corner of the system mentioned in the title was described when in equilibrium. There now follows the description of the structure of the same alloys in the case of an equilibrium disturbed by hardening or tempering. The investigation concerned zirconium alloys with up to 4 at% Sn+Mo. The alloys used are mentioned in the diagram (Fig 1). The investigation was carried out by means of X-ray- and microstructural analyses (Fig 2). The following results were obtained: 1) The β -phase existing in the ternary alloy Zr-Mo-Sn at high temperatures is converted by hardening either into the α' -phase with the lattice of α -Zr, or into the ω -phase with a hexagonal lattice of its own, according to the

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SOV/78-4-7-27/44

The Conversion of the Ternary Alloys of the Zirconium-corner of the System
Zr - Sn - Mo in Hardening and Tempering

low or high Mo content. In this respect there is an analogy to many titanium alloys. 2) The greatest amount of hardness is attained in the conversion of the β -phase into the ω -phase. The molybdenum content in this case is of greater influence than the tin content. 3) The α' -phase formed by hardening, an oversaturated solution of Mo and Sn in α -Zr, decays by heating to 250-450°. The decay develops according to the scheme of heterogeneous aging. The greatest hardness

(350 kg/mm²) is attained by tempering at 400°. Tempering at 500° reduced hardness to 250 kg/mm² as a result of the removal of distortions of the crystal lattice and coagulation of the separated phases. Alloys which are in the state $\beta + \omega$ -phase after hardening increase their hardness from 330 to 450 kg/mm² if tempering temperature is increased from 150 to 300°, although no structural changes could be detected by means of an X-ray examination. At 500° the $\beta + \omega$ -structure decays into a solid α -solution and probably into ZrMo₂. Tempering at

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SOV/78-4-7-27/44

The Conversion of the Ternary Alloys of the Zirconium-corner of the System
Zr - Sn - Mo in Hardening and Tempering

450-500° causes a considerable reduction of hardness. In
figures 4-7 diagrams of hardness variations at various tempera-
tures are shown. There are 7 figures and 3 references, 2 of
which are Soviet.

SUBMITTED: March 1, 1958

Card 3/3

KONTOROVICH, I.Ye.; SEMENOV, A.T.

Effect of alloying elements on the properties of titanium-
aluminum alloys. Izv. vys. ucheb. zav.; tsvet. met. 3 no. 6:144-
148 '60. (MIRA 14:1)

1. Moskovskiy vecherniy metallurgicheskiy institut. Kafedra
metallovedeniya i termicheskoy obrabotki splavov.
(Titanium-aluminum alloys)

33883
S/640/61/000/000/004/035
D258/D302

18.1247
21.2100

AUTHORS: Ivanov, O. S., Badayeva, T. A., Semenchenkov, A. T.
and Kuznetsova, R. I.

TITLE: The structure of the system uranium-molybdenum at 600 -
1200°C and the properties of its alloys

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Stroyeniye
splavov nekotorykh sistem s uranom i toriyem. Moscow,
Gosatomizdat, 1961, 48-67

TEXT: This work was aimed at providing experimental data for the
construction of an equilibrium diagram for the above system, in
the temperature region of 0 - 800°C and for the composition range
of 0 - 32 at.-% molybdenum. Firstly, the region of occurrence of
the β -phase was explored by studying the transformations, occurring
in alloys containing 0.5 - 5 at.-% Mo. The samples were cut from
alloys cast in a high-frequency furnace, homogenized for 48 hours,
at 800°C and then successively held at 600°C (12 hrs), 500°C (240
hrs), and 400°C (240 hrs). Dilatometric investigation at up to

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The structure of the ...

800°C showed that, at less than 4 at.-% Mo, there is a gap between the end of the $\alpha \rightarrow \beta$ transformation and the beginning of $\beta \rightarrow \gamma$; this gap disappeared at higher Mo contents. On the other hand, micrographs of samples (quenched from 675 - 750°C and heated before for long periods) show the existence of a γ -phase in samples containing only 1 at.-% Mo; this phase goes up to 80% of the total volume, at 5 at.-%. On the strength of this evidence, the $\beta/(\beta + \gamma)$ boundary is markedly displaced towards the Mo-poor side. The second series included samples containing 0.05 - 90 at.-% Mo. Micrographs recorded on cast samples in the range of 24-90 at.-% confirmed the peritectic nature of the crystallization. Dendritic liquation was observed in the range of 24 - 36 at.-% and led to the assumption of a peritectic point at 32-36 at.-% Mo. The microstructure of homogenized (1000°C for 72 hrs) and quenched samples consisted of 2 phases, beginning with a content of 35.2 at.-%. A 90 at.-% alloy contained only 8 - 8% (per volume) of the γ -solid solution, indicating the limited solubility of uranium in molybdenum. Small nuclei of the second phase were clearly seen within the γ_{Mo} ✓

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The structure of the ...

solid solutions. The hardness-composition curve showed a maximum at 3.5 at.-%, indicating the $\alpha \rightarrow \delta$ transformation; a minimum at 11 at.-%, corresponding to the transformation $(\alpha + \delta) \rightarrow \delta$; and a broad maximum at 38 at.-%, indicating $\delta \rightarrow (\delta + \delta_{\text{Mo}})$. The hardness ranged from 120 to 425 kg/mm². The curve of the lattice parameter vs. composition for the δ -solid solution is an almost straight line leading from 3.467 kX to 3.140 kX; according to this curve, the $\delta/(\delta + \delta_{\text{Mo}})$ boundary at 1000°C was set near 35.5 at.-% Mo. The X-ray analysis of Mo-poor samples showed that within the range of 0 to 8 at.-%, b fell from 5.852 to 5.784 kX, while a and c did not change and the atomic volume decreased, from 20.64 to appr. 20.3 (kX)³. A separate X-ray series of tests in the range of 0.63 - 5.06 at.-% was performed on samples quenched from 800°C. A mixture of α - and β -phases was identified at up to 2.27 at.-%; at 2.93 - 5.06 at.-%, only α was present. Similarly, X-ray analyses were performed on samples quenched from 750°C, 700°C and 600°C, following prolonged heating periods. At the latter temperature both hardness and micrograph analyses indicated the $(\alpha + \delta)/\delta$ boundary to be at 17.5

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The structure of the ...

at.-% Mo. There are 15 figures and 5 references: 1 Soviet-bloc and 4 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: P. Pfeil, The Constitution of Uranium-Molybdenum Alloys. J. Inst. Metals, 77, 553-570 (Aug. 1950); C. W. Tucker, Discussion on the Constitution of Uranium-Molybdenum Alloys. J. Inst. Metals, 78, 760 (1951); P.C.Z. Pfeil and J. D. Browne, Superlattice Formation in Uranium-Molybdenum Alloys, AERE M/R 1333 (1954); E. K. Halteman, The Crystal Structure of U_2Mo . Acta Cryst. 10, 166, (1957). ✓

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33884

S/640/61/000/000/005/035
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18.1247
21.2100

AUTHORS: Ivanov, O. S., Semenchenkov, A. T. and Kozlova, N. I.

TITLE: The structure of the system uranium-molybdenum below 600°C and the complete equilibrium diagram of this system

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Stroyeniye splavov nekotorykh sistem s uranom i toriyem. Moscow, Gosatomizdat, 1961, 68-86

TEXT: The authors investigated the formation of the δ_2 -phase below 600°C and its coexistence with other phases in the U-Mo system. The data gathered in this investigation were combined with the authors' and coworkers earlier results (Ref. 1: This publication, p. 48) in order to yield a complete equilibrium diagram, whose uranium rich corner is shown in a figure. Molybdenum depresses the transformation $\alpha \rightleftharpoons \beta$ and $\beta \rightleftharpoons \gamma$ to such an extent that an eutectic equilibrium, $\beta(\sim 1.4 \text{ at.-% Mo}) \rightleftharpoons (\gamma < 0.1 \text{ at.-% Mo}) + \delta_2(8 \text{ at.-% Mo})$ is formed near 648°C. The phase $(\alpha + \gamma)$ existing below 648°C, meets the $\gamma + \delta_2$

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The structure of the system ...

(U₂Mo)-phase and as a result, a second eutectic equilibrium $\gamma(21.5 \text{ at.-% Mo}) \rightleftharpoons (\gamma + \delta_2)$ is formed at 572°C. Lastly, the equilibrium $\gamma + \gamma_{\text{Mo}}$ meets the equilibrium $\gamma + \delta_2$ and forms a third invariant equilibrium, namely $\gamma(35 \text{ at.-% Mo}) \rightleftharpoons \gamma_{\text{Mo}}(\sim 98 \text{ at.-% Mo}) + \delta_2$ at 600°C. The boundaries of the δ_2 -phase are not fully specified. The γ -solid solution containing 3 at.-% Mo is fully converted on quenching into α' which consists of a supersaturated solution of Mo in α -U. The hardness of α' is sharply increased by a rise in the Mo-content and attains a maximum at 3 - 4 at.-% Mo (400 kg/mm² for samples quenched from 1000°C). A further rise of the Mo content causes the hardness to be steeply decreased, thus indicating a depression of the α' -phase. A minimum (100 - 300 kg/mm²) is reached at 10 - 12 at.-% Mo. At this composition, the cubical lattice of the γ -solid solution is transformed into a tetragonal one, with dimensions $a = 3.463 \text{ kX}$, $c = 3.372 \text{ kX}$ and $c/a = 0.9737$ at 10 at.-% Mo. The tetragonal nature of the lattice is less pronounced at 12 at.-%

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The structure of the system...

500°C are decomposed as a result of both α -phase separation and the formation of the δ_2 -phase. The former process is the leading one, in the composition range of 20 at.-% Mo. This separation and the inherent heterogenization is accompanied by a rise in hardness; while the formation of the δ_2 -phase, at 30 at.-%, leads to a small decrease of hardness. There are 15 figures and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: E. K. Halteman. The crystal structure of U_2Mo . Acta Cryst. 10, 166 (1957). ✓

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S/640/61/000/000/020/035
D205/D302

21,2100

AUTHORS: Semenchenkov, A. T. and Ivanov, O. S.

TITLE: Structure of alloys of uranium-zirconium-titanium

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Stroyeniye splavov nekotorykh sistem s uranom i toriyem. Moscow, Gosatomizdat, 1961, 312-324

TEXT: The present investigation presents additional data of the above system, in particular for alloys containing more than 50 at.% of the alloying elements. The alloys were quenched from 900°C, i.e. from the δ -solid solution state. The martensitic transformations and stability of the δ -phase were investigated. The alloys were prepared by smelting in an arc furnace, using U 99.77%, Zr 99.80% and Ti 97.70% pure, under argon. To remove intercrystalline liquation the alloys were homogenized at 1000°C for 72 hours. Forged samples were studied by X-ray powder photography and their hardness was measured. From the limiting binary systems the U-Ti system was investigated more thoroughly. At the Ti concentrations of

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Structure of alloys ...

17.5 - 23 at.-% and 65 - 92%, the γ -solid solution is preserved by quenching, down to room temperature. The alloys of these compositions had hardness ranging from 220 - 300 kg/mm². The alloys in the range of 25 - 62.5% Ti contain U₂Ti. Formation of this compound cannot be prevented by the increase of the rate of cooling during hardening. In the U-Zr-Ti system the hardness and lattice parameter changes are plotted for the investigated Zr:Ti = 1:3, 1:1, 3:1 sections. Finally the data obtained are summarized in the phase diagram represented on the concentration triangle and in curves of equal hardness represented in a similar manner. The ternary γ -solid solution, prevailing in the whole system at 900°C is decomposed during quenching. The manner of the decomposition depends on the composition. Very sharp hardness changes occur as a result of these transformations. There are 11 figures and 16 references: 3 Soviet-bloc and 13 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: H. A. Saller, F. A. Rough, A. A. Bouer and R. J. Diog. J. Metals, 9, 878, 881, (July 1957); B. W. Bowlett and A. G. Knap-

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ten, Paper No. 1469, presented at the II International Conference
for Peaceful Use of Atomic Energy; E. R. Boyko, Acta Cryst. 10,
712, (1957); M. Mueller, Acta Cryst., 8, 849 (1955).

Card 3/3

SEMENCHEV, A., inzhener.

Methods of progressive miners of the Karaganda Basin. Mast. ugl.
4 no.10:8-9 0 '55. (MLRA 9:1)
(Karaganda Basin--Coal mines and mining) (Mining engineering)